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Sir:

Transmitted herewith for filing is the patent application of:

Inventor: George Mentrup and Paul Damien

For: DATA STORAGE-ENCRYPTION-RETRIEVAL DEVICES AND METHODS WITH RESULTING BUSINESS PROCESSES

Enclosed are:

✓ Abstract of the Disclosure (1 page) and14 Pages of Specification and Claims14 Sheets of drawings

Information Disclosure Statement

Verified statement(s) to establish small entity status under  
37 C.F.R. 1.9 and 37 C.F.R. 1.27

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MULTIPLE DEPENDENT CLAIM PRESENTED	_____	+130		\$ _____	or +260 =	\$ _____
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Respectfully submitted,

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## STORAGE-ENCRYPTION-RETRIEVAL

## DEVICE AND METHOD WITH RESULTING BUSINESS PROCESSES

## **Provisional Patent Application**

4 Applicants claim priority based on provisional patent application serial No. 60/139,279  
5 filed on June 15, 1999.

## **Background of the Invention**

## 1. Field of the Invention

8 The present invention relates generally to a device and method for storing,  
9 encrypting and retrieving strings of alphanumeric characters, said strings of characters  
10 representing personal, private information such as bank PIN numbers, computer log-in  
11 codes, and credit card numbers, for example.

## 2. Description of the Prior Art

13        With the ever-increasing use of computers and automated systems to provide a  
14        wide variety of services, consumers today often must remember a large number of  
15        passwords, log-in ID's, account numbers and the like. Consumers often must be able to  
16        recall and use this information at any time and at any location without access to records or  
17        documentation that contain the information. Thus, there is a need for a device and method  
18        to store important, personal information such as bank PIN's, charge account numbers,  
19        computer log-in ID's, calling card numbers, unlisted telephone numbers, and the like.

20 Much of the data that a consumer would want to store would be strings of  
21 characters which represent access codes. This might be a string of four numbers which

1 represent a bank PIN that allows access to a bank account, or a string of eight letters  
2 which form a word that allows access to a computer system. Obviously, the consumer  
3 does not want unauthorized access to any accounts, computer systems, records, and the  
4 like. Thus, there is a need for a device and method that easily encrypts said information.

5 Consumers typically need to retrieve their access information when they are  
6 traveling, driving in their car, shopping and the like. Thus, it is important that said  
7 information can be quickly and easily retrieved. A consumer may get confused or forget  
8 how to use a complicated encryption/decryption device, or may have an electronic device  
9 that they either forgot to bring or that is not working properly. Thus, there is a need for a  
10 device and method that allow for quick and easy retrieval of said information and that is  
11 not subject to breakage or failure.

12 The Kohut U.S. Patent No. 5,742,035 discloses a method of encrypting credit card  
13 PIN's using a 3 by 3 grid of preprintd numbers placed on the credit card itself. The four  
14 numbers comprising the PIN are placed in the 9-number grid in a location known only to  
15 the user and the card issuer. Although this method may work well for an individual credit  
16 card PIN number, it does not allow a user to store, encrypt or retrive any other personal  
17 information.

18 The Vlaar U.S. Patent No. 5,321,755 discloses a method of encrypting data which  
19 involves a slidable element contained within a cover element. The cover element is  
20 marked with locations for each of up to four numbers. The slidable element is then moved  
21 within the cover element to spell a codeword. The marked positions on the cover element

1 then identify a number from one to ten on a number line also contained on the slideable  
2 element. This device and method appear to only be suitable for number codes up to four  
3 digits in length. This is because each number requires a position marker on its own line.  
4 Moreover, this method does not appear to be designed to handle letters or other  
5 characters. Also because a four digit number requires four separate lines for position  
6 markers, the cover element is severely limited as to how many numbers it can code  
7 because there simply is not enough room on the cover element.

8        Thus there is a need for a method and device that allows users to store, encrypt  
9        and retrieve a variety of personal information with a wide range of character lengths that is  
10      easy, quick, inexpensive, and convenient.

### Summary of the Invention

12 In the practice of the present invention, an encryption device and method are  
13 provided for storing, encrypting and retrieving multiple encrypted character strings  
14 utilizing a single code character string or master password. The device includes a card  
15 with a grid printed thereon having multiple rows and columns. The master password can  
16 be located in any row or in any column. Encrypted character strings are then retrieved  
17 from the other rows or columns. A sleeve can be used to assist the user with locating the  
18 individual characters of the encrypted character strings where the characters being  
19 retrieved are offset from the corresponding characters of the master password by a  
20 predetermined number of columns. The master password and encrypted character strings  
21 can be oriented in various directions on front and back faces of the card on which they are

1        encrypted. The device is user programmable, and reprogrammable, whereby security of  
2        the device is within the control of the user.

### 3 Principle Objects and Advantages of the Invention

4 The principle objects and advantages of the present invention include: providing an  
5 encryption device and method; providing such a device and method for storing, encrypting  
6 and retrieving character strings; providing such a device which is user programmable;  
7 providing such a device which is reprogrammable; providing such a device which provides  
8 substantial security within the control of a user; providing such a device which can replace  
9 credit and debit cards; providing such a device which accommodates a wide variety of  
10 formats for character input; providing such a device which reduces the need to remember  
11 multiple character strings; providing such a device which can be utilized for promotional  
12 purposes by printing commercial messages thereon; and providing such a device which is  
13 economical to manufacture, efficient in operation in particularly well adapted for the  
14 proposed use thereof.

### **Brief Description of the Drawings**

2 Fig. 1 is a front elevational view of an encryption device embodying the present  
3 invention.

4 Figs. 2a-e are front elevational views thereof, showing the steps of the method of  
5 the present invention.

6 Fig. 3 is a front elevational view of an encryption device comprising a first  
7 modified embodiment of the present invention.

8 Fig. 4 is a front elevational view of an encryption device comprising a second  
9 modified embodiment of the present invention.

10 Figs. 5a,b are front and back elevational views of an encryption device comprising  
11 a third modified embodiment of the present invention.

12 Figs. 6a,b are front and back elevational views of an encryption device comprising  
13 a fourth modified embodiment of the present invention.

14 Figs. 7a,b are front elevational views of an encryption device comprising a fifth  
15 modified embodiment of the present invention.

16 Figs. 8a,c and e and Figs. 8b,d and g are front and back elevational views  
17 respectively of an encryption device comprising a sixth modified embodiment of the  
18 present invention.

## **Detailed Description of the Preferred Embodiments**

## 21 I. Introduction and Environment

1        As required, detailed embodiments of the present invention are disclosed herein;  
2        however, it is to be understood that the disclosed embodiments are merely exemplary of  
3        the invention, which may be embodied in various forms. Therefore, specific structural and  
4        functional details disclosed herein are not to be interpreted as limiting, but merely as a  
5        basis for the claims and as a representative basis for teaching one skilled in the art to  
6        variously employ the present invention in virtually any appropriately detailed structure.

7        **II.      Encryption Device 2 and Method**

8        Referring to the drawings in more detail, Fig. 1 shows an encryption device 2  
9        embodying the present invention and generally comprising a card 4 and a sleeve 6. The  
10      card 4 may be made of paper, plastic, cardboard, or other suitable material which allows a  
11      user to imprint or mark on its surface. The dimensions of the card 4 should be such that  
12      it can be conveniently carried by the user. In the preferred embodiment, the dimensions of  
13      the card 4 are approximately the dimensions of a standard credit card. However, various  
14      other suitable dimensions can be used, including dimensions corresponding to the size of a  
15      note card or the size of a notebook.

16        Displayed on the surface of the card 4 is a geometric grid 12. The geometric grid  
17      12 is comprised of individual graphic boxes 14 of a size large enough to accept one or  
18      more characters 16. The graphic boxes 14 are arrayed in five rows 10a-e and eight  
19      columns 8a-h forming the geometric grid 12. The geometric grid 12 may be imprinted or  
20      otherwise affixed to the card 4 in any fashion.

1        In the embodiment shown in Figs. 1 and 2a-e, three encrypted character strings 18  
2        can be stored within the geometric grid 12 in the middle rows 10b-d. The top row 10a is  
3        used for a master password or code character string 20 and the bottom row 10e is  
4        concealed by the sleeve 6.

5        The sleeve 6 includes open and closed ends 22, 24; a three-row by one-column  
6        window 26 through which the grid 12 is visible and a recess 28 at the open end 22 to  
7        facilitate reciprocably sliding the card 4 within the sleeve 6.

8        Figs. 2a-e show the method of programming or encrypting stored character strings  
9        18 (comprising “DOG” and “CAT”) for retrieval using a password or code character  
10       string 20 (comprising “ABC”). Fig. 2a shows inputting the first letters of the code and  
11       encrypted character strings 20, 18. More specifically, the first letter of the code character  
12       string 20 (“A”) is input on the upper row 10a and the first letters (i.e., ”D” and “C”) of the  
13       encrypted character strings 18 are input in the upper two boxes 14 visible through the  
14       window 26. The window 26 and the open end 22 of the sleeve 6 cooperate to  
15       automatically offset the characters 16 of the code character string 20 and the  
16       corresponding, respective characters of the encrypted character strings 18.

17       Figs. 2b-d show the method steps for adding the rest of the characters 16  
18       comprising the character strings 18, 20 and the resulting card 4, which can be completely  
19       filled in with dummy characters as shown in Fig. 2e. A user only needs to remember the  
20       code character string or master password 20 in order to retrieve the encrypted character  
21       strings 18 by repositioning the card 4 within the sleeve 6 whereby the code character

1 string characters 16 are located adjacent to the sleeve open end 22 when the  
2 corresponding characters 16 of the encrypted character strings 18 are displayed in the  
3 window 26.

4 Variations on the above device and method include encrypting character strings 18  
5 with fewer characters 16 than the code character string 20. This situation can be  
6 accommodated by using the first character 16 to identify the number of characters in an  
7 encrypted character string 18, or by utilizing a specific, user-defined “end-of-string”  
8 character.

9 **III. First Modified Embodiment Encryption Device 102 and Method**

10 Fig. 3 shows a modified encryption device 102 comprising a first modified  
11 embodiment of the present invention. A modified card 4 includes a grid 112 with an upper  
12 row 110a of boxes 114a for a master password or code character string 120 and rows  
13 110b-e of boxes 114b-e which are half the size of the boxes 114a whereby a 1-to-2 ratio  
14 of code character string boxes 114a to encrypted character string boxes 114b-e is  
15 provided. Thus, a master password or code character string 120 can yield encrypted  
16 character strings 118 with twice as many characters.

17 **IV. Second Modified Embodiment Encryption Device 202 and Method**

18 Fig. 4 shows an encryption device 202 comprising a second modified embodiment  
19 of the present invention. The device 202 uses a code character string 220 with two  
20 encrypted character string characters 216 for each character 216 of the encrypted

1 character string 218. The master password can be identified from either the left or right  
2 individual characters 216 in each of the boxes 214.

3 **V. Third Modified Embodiment Encryption Device 302 and Method**

4 Figs. 5a,b show an encryption device 302 comprising a third modified embodiment  
5 of the present invention. The encryption device 302 includes a modified card 304 with a  
6 front 304a and a back 304b. Front and back windows 326a,b reveal front and back grids  
7 312a,b. The card 304 has portions of the encrypted character strings 318 imprinted in the  
8 front and back grids 312a,b respectively. The data encryption method utilizing the  
9 encryption device 302 involves alternating the encrypted character readings from the front  
10 304a and back 304b of the card. For example, two characters 316 of the encrypted  
11 character string 318 can be obtained through the front and back windows 326a,b by  
12 aligning the card 304 with the respective character 316 of the master password and  
13 sequentially reading the exposed characters 316 of the encrypted character string 320.

14 **VI. Fourth Modified Embodiment Encryption Device 402 and Method**

15 A two-sided encryption device 402 comprising a fourth modified embodiment of  
16 the present invention is shown in Figs. 6a,b and includes a card sleeve 406 with a similar  
17 front 406a and back 406b with respective windows 426a,b. A card 404 likewise has a  
18 similar front 404a and back 404b. The front and back of the device 402 can be used  
19 independently or in conjunction with each other to store either twice as many encrypted  
20 character strings or the same number of character strings with twice the length of  
21 character strings that can be stored with a single-sided device.

1      **VII. Fifth Modified Embodiment Encryption Device 502 and Method**

2      Figs. 7a,b show an encryption device 502 with the encrypted two-character strings  
3      518 arranged vertically within the window 526. Thus, in practicing the method of the  
4      present invention with the device 502, the master password "A5" would yield the  
5      encrypted character string "Z9MR8V".

6      **VIII. Sixth Modified Embodiment Encryption Device 602 and Method**

7      An encryption device 602 comprising a sixth modified embodiment of the present  
8      invention is shown in Figs. 8a-f. The device 602 includes a card 604 with a front 604a and  
9      a back 604b. A front grid 612a includes columns 608a and rows 610a. A back grid 612b  
10     includes columns 608b and rows 610b. A master password can comprise a predetermined  
11     sequence of alphabetical and numerical characters. For example, the master password "A  
12     2B3A1" yields "MIGHTY" and "VECTOR". "A2" indicates read two letters ("MI") on  
13     the front 604a, beginning in row 2. "B3" indicates read three letters ("GHT") on the back  
14     604b. "A1" indicates read one letter ("Y") on the front 604a. "VECTOR" is obtained in a  
15     similar manner from the adjacent columns on the front 604a and on the back 604b.

16     **IX. Seventh Modified Embodiment Encryption Device 702 and Method**

17     Fig. 9 shows an encryption device 702 comprising a seventh modified embodiment  
18     of the present invention. The encryption device 702 comprises a card 704 with a grid 712  
19     comprising multiple columns 708a-k and multiple rows 710a-g defining individual boxes  
20     714. The encryption device 702 operates in a manner similar to the encryption device 2  
21     described above, except that no sleeve is provided and the user is thus able to program the

1 master password and the encrypted character strings with any offset desired, or with no  
2 offset. Thus, the corresponding individual characters of the master password and the  
3 encrypted character strings can align vertically. For example, the master password “ABC”  
4 yields the encrypted the character strings “DOG” and “CAT”, with the corresponding  
5 characters of the master password and the encrypted character strayings aligning  
6 vertically. The rightmost column 708k can be used for abbreviated labels.

7 The encryption methods discussed above are generally available with the  
8 encryption device 702. Thus, the encryption device 702 can be printed on both sides, and  
9 vertical master passwords can be employed. Among the variations available for operating  
10 the method are encrypting the character strings to read from left-to-right, right-to-left,  
11 top-to-bottom and bottom-to-top.

12 **X. Eighth Modified Embodiment Encryption Device 802 and Method**

13 Fig. 10 shows an encryption device 802 comprising an eighth modified  
14 embodiment of the present intention. The encryption device 802 is similar to the  
15 sleeveless card 702 described above, with the addition of a magnetic strip 804 adapted for  
16 identification and verification purposes. The encryption device 802 functions as a credit  
17 or debit card whereby the strip 804 can be swiped. The master password can be used for  
18 retrieving multiple encrypted character strings, which can correspond to the numbers of  
19 various credit and debit card accounts. Thus, a single encryption device 802 can replace a  
20 number of credit and/or debit cards.

1 It is to be understood that while certain forms of the present intention have been  
2 illustrated and described herein, it is not to be limited to the spfortoecific forms or  
3 arrangements of components and/or steps described and shown.

4

1      **CLAIMS**

2      We claim:

3      1.      A method for storing and encrypting one or more sequences of characters within a  
4      geometric grid positioned on a device, comprising;

5              a) choosing a master code sequence of characters;

6              b) placing said master code sequence of characters within said geometric grid so  
7              that the correct order of said characters is not readily apparent;

8              c) selecting one sequence of characters representing information to be stored and  
9              encrypted; and

10              d) placing said sequence of characters within said geometric grid such that the  
11              correct order of said sequence is not readily apparent and such that the location of  
12              each character of said sequence in the geometric grid has a predetermined  
13              relationship to the location of at least one character of said master code sequence  
14              of characters.

15      2.      A device for storing, encrypting, and retrieving data comprising;

16              a) a card with a surface that is capable of being imprinted with characters by a  
17              user; and

18              b) at least one geometric grid containing a plurality of graphic boxes for accepting  
19              characters imprinted or otherwise affixed to the surface of said card.

20

21

1       3.    A device for storing, encrypting, and retrieving data comprising;

2           a) a card with a surface that is capable of being imprinted with characters by a

3           user; and

4           b) at least one geometric grid containing a plurality of graphic boxes for accepting

5           characters imprinted or otherwise affixed to the surface of said card; and

6           c) a sleeve that covers said card and allows said card to move within it.

7

8

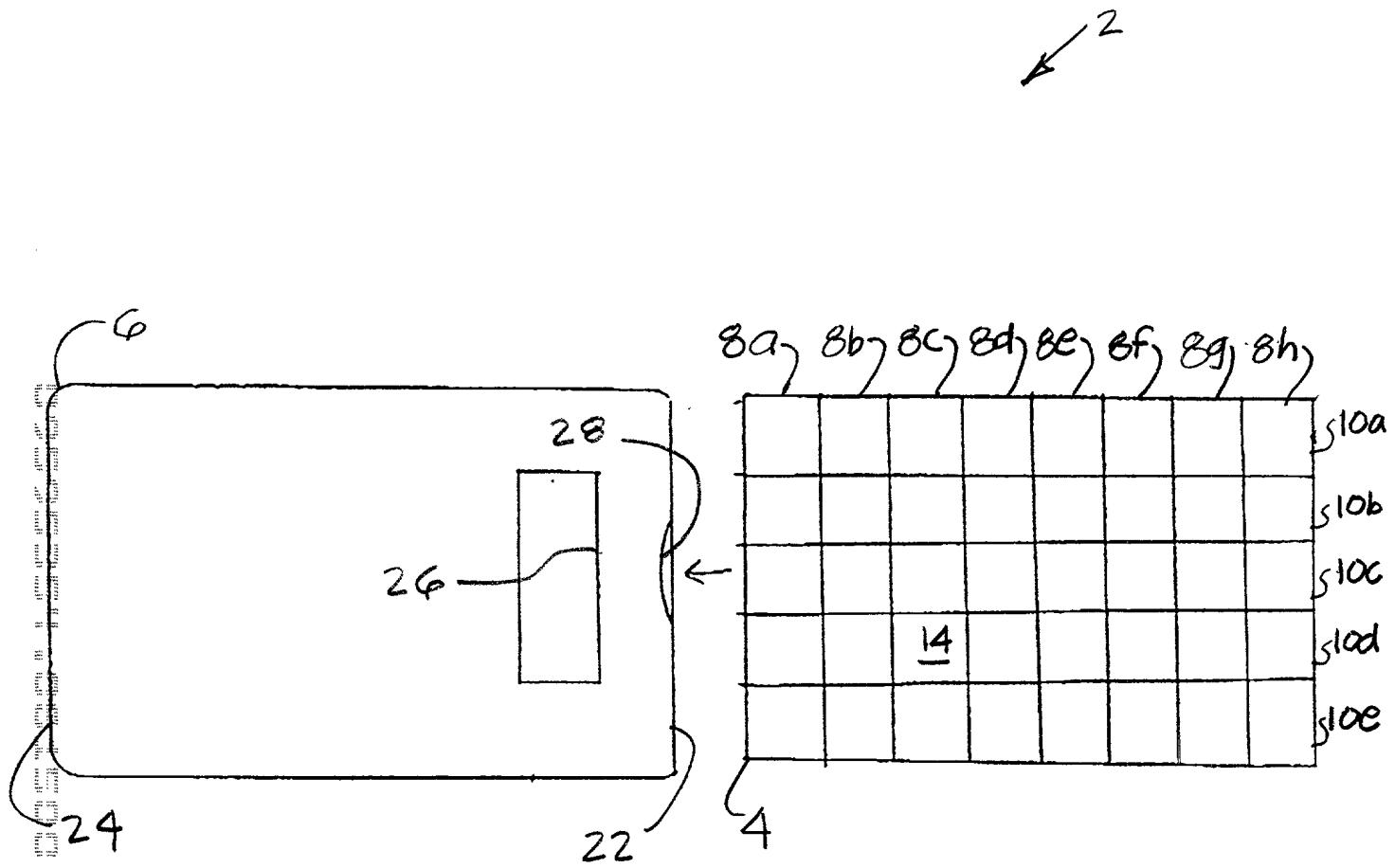
9

10

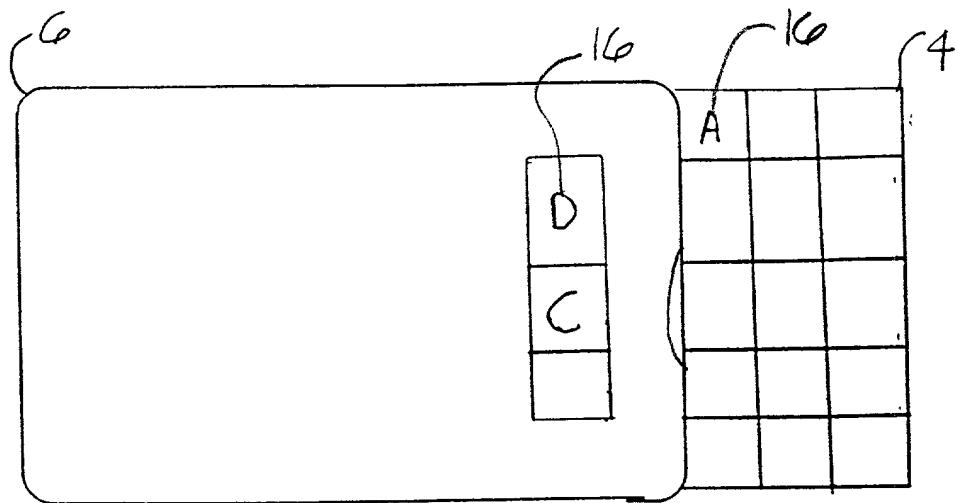
## **Abstract of the Disclosure**

2 An encryption device includes a card with a grid comprising multiple rows and  
3 columns defining boxes for receiving individual characters. One of the columns or rows  
4 contains a master password or code character string. Other columns or rows contain  
5 encrypted character strings. The individual characters of the master password can be  
6 offset with respect to corresponding, individual characters of the encrypted character  
7 strings. A sleeve slidably, reciprocably receives the card and assists with aligning the  
8 characters of the master password and the characters of the encrypted character strings,  
9 which are visible through a window in the sleeve. A method of storing, encrypting and  
10 retrieving character strings utilizes the encryption device.

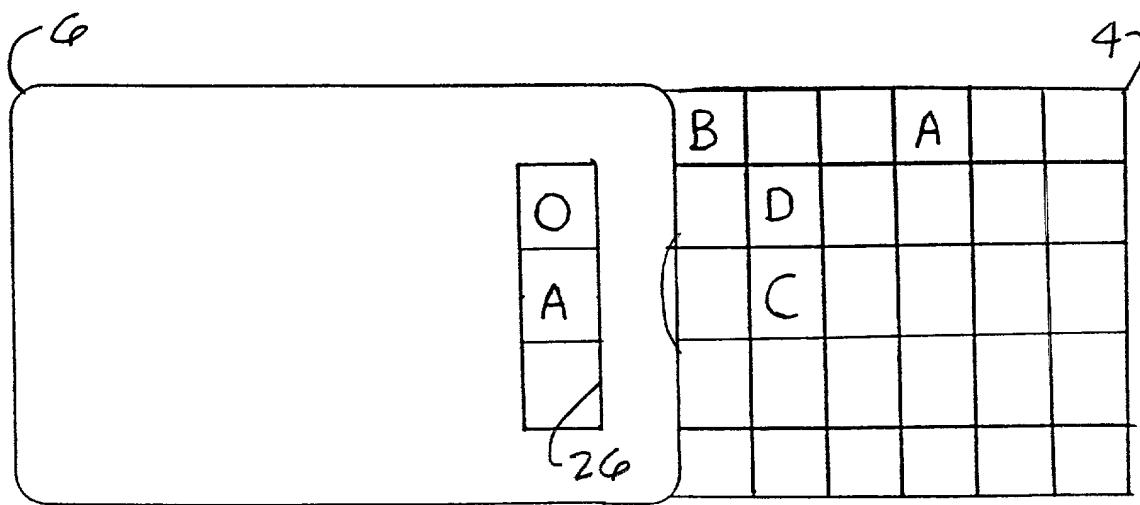
# FIG. 1



# FIG. 2



# FIG. 2a



# FIG. 2b

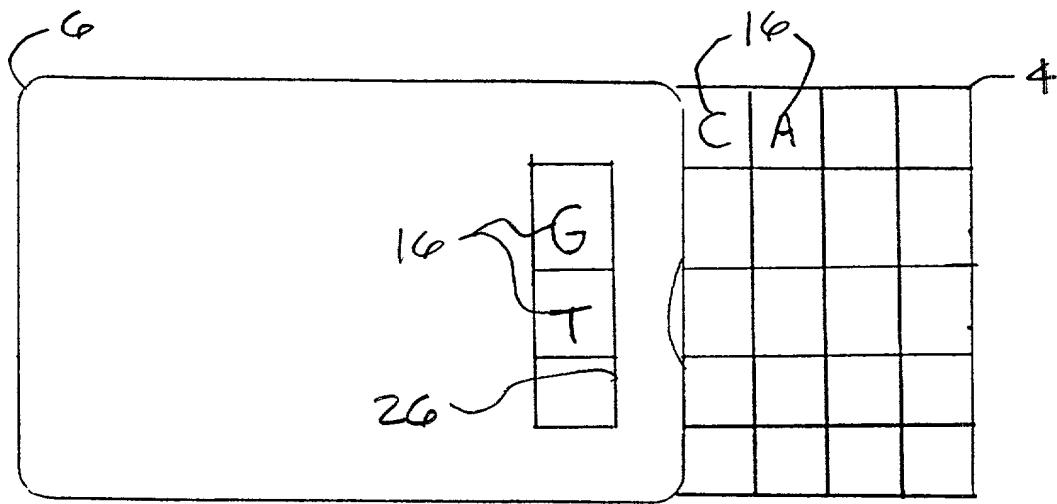


FIG. 2c

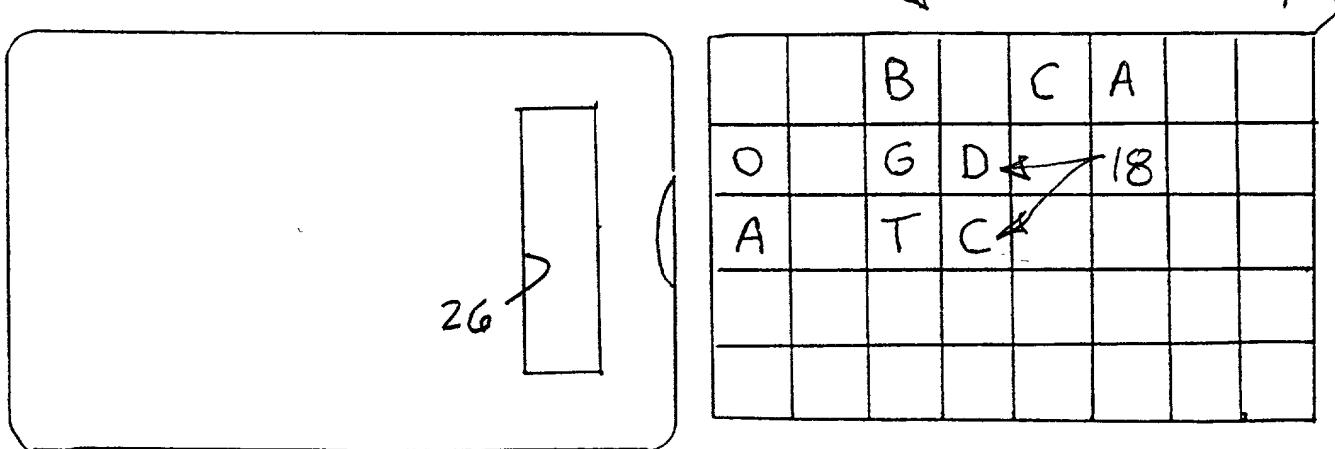
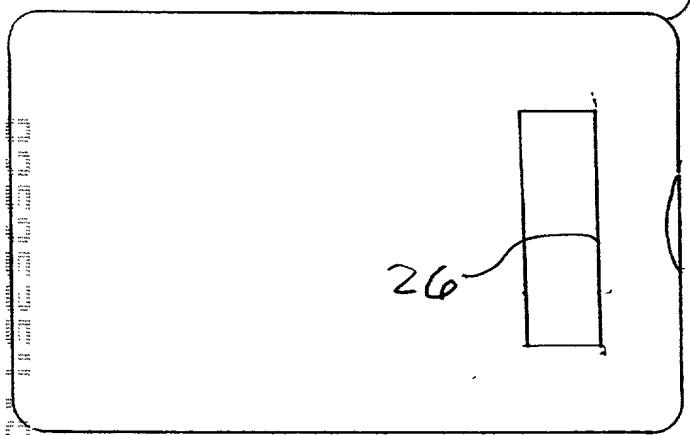


FIG. 2d



5	Q	B	Z	C	A	#	L	
O	M	G	D	B	8	C	C	
A	6	T	C	N	#	L	V	
V	A	R	6	2	Q	Y	I	
8	8	Z	G	P	D	N	4	

FIG. 2e

# FIG. 3

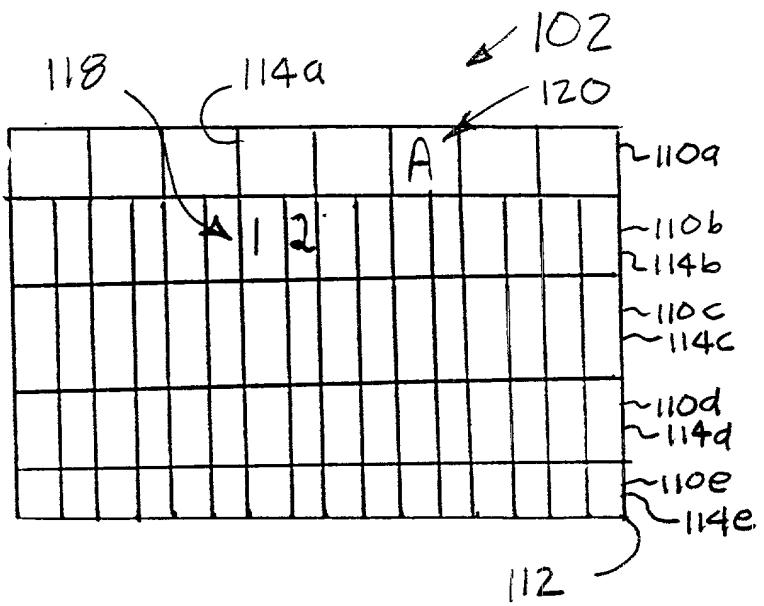
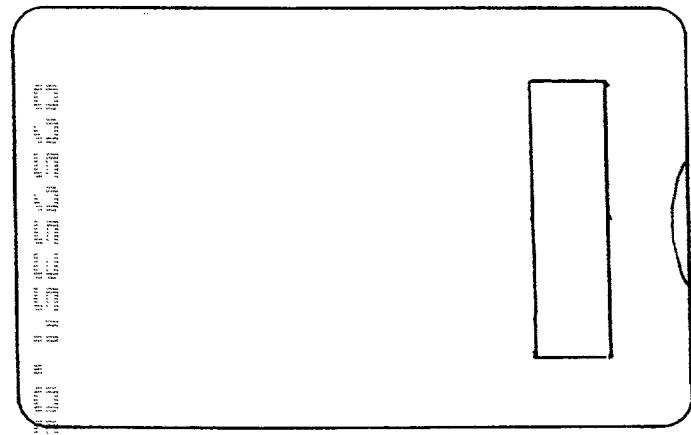
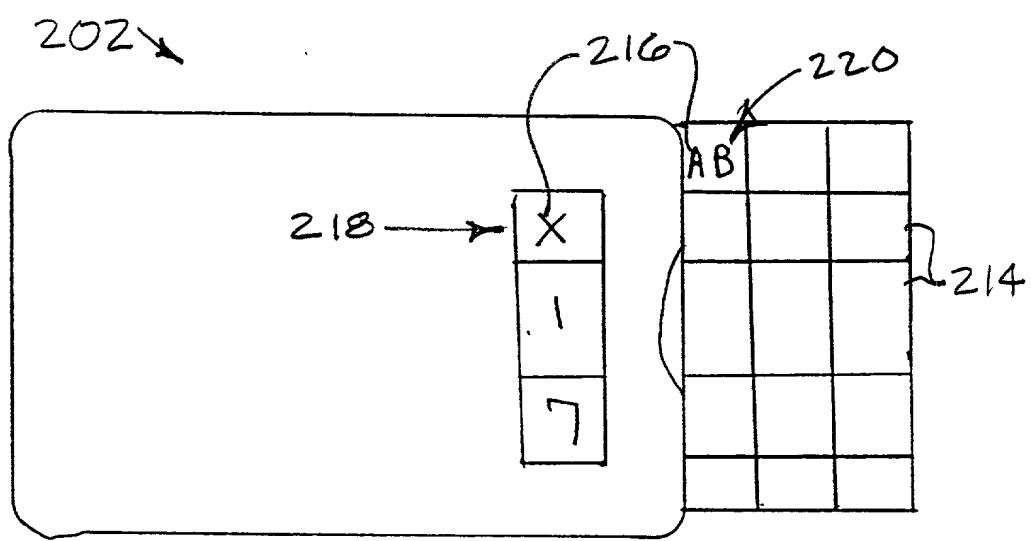
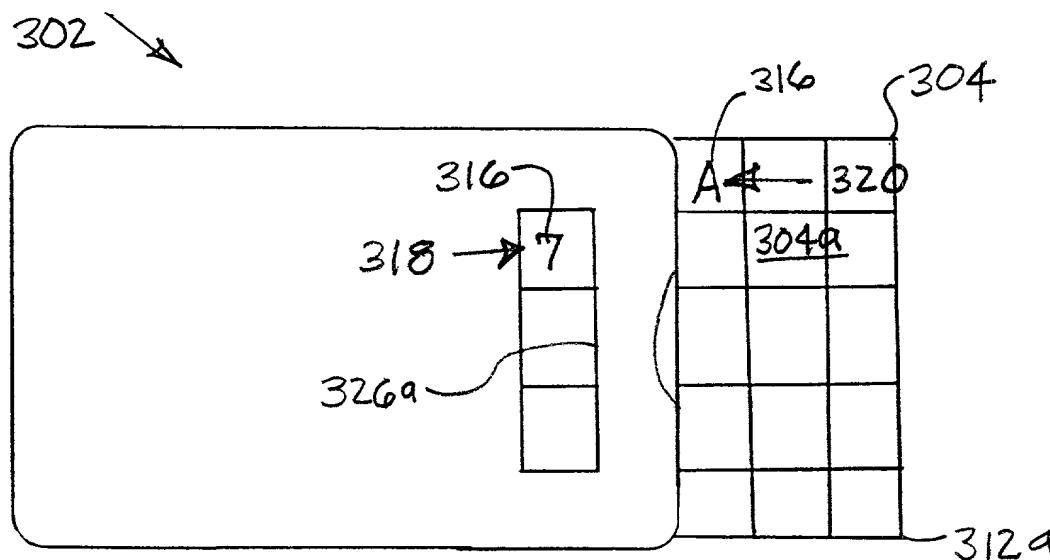
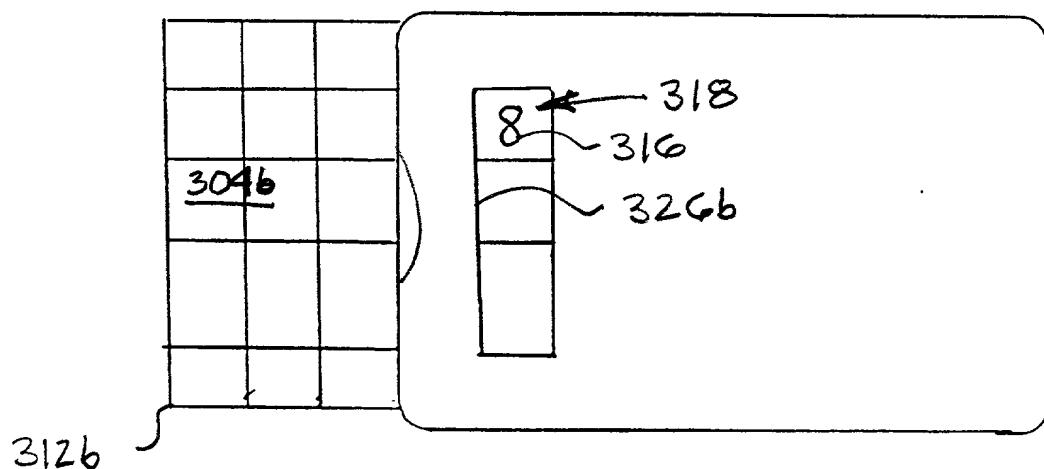


FIG. 4





**FIG. 5a**



**FIG. 5b**

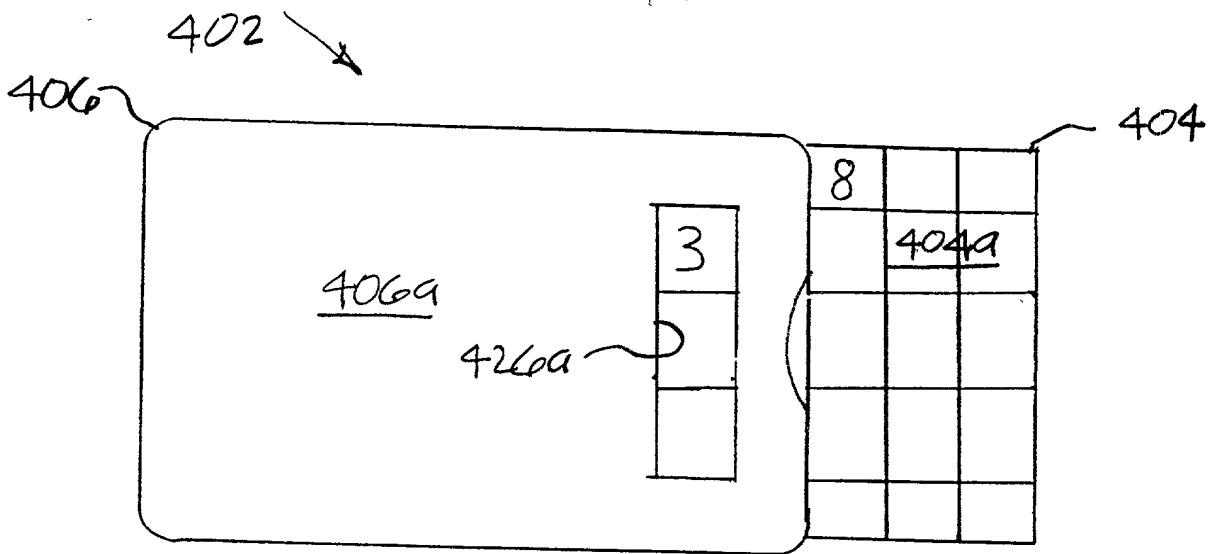


FIG. 6a

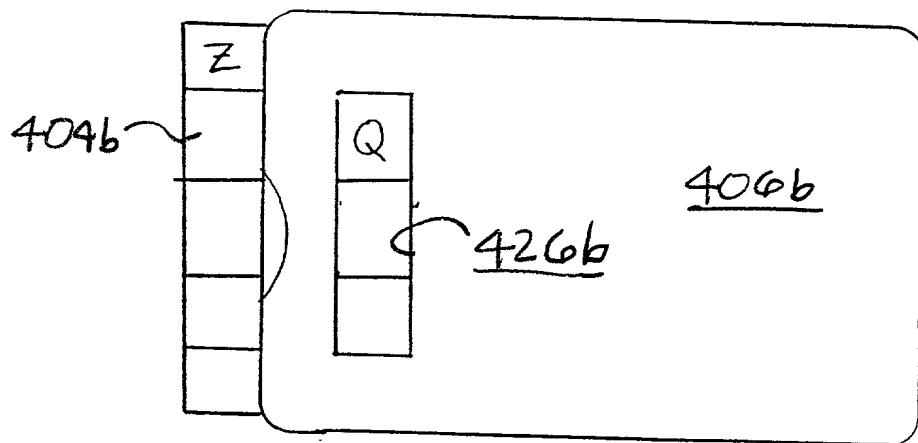


FIG. 6b

502

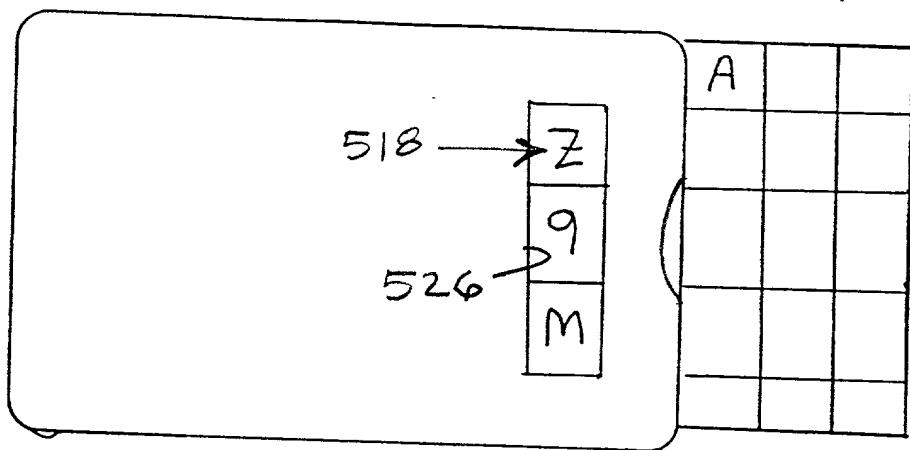


FIG. 7a

502  
518  
526  
9  
M

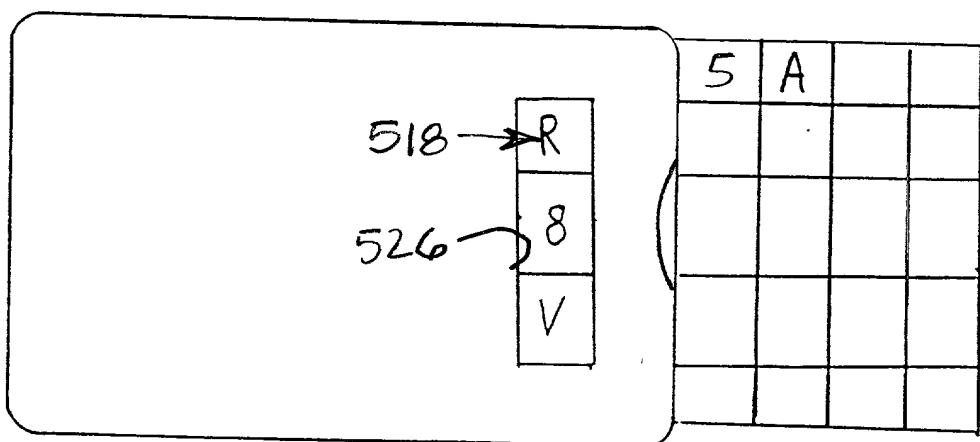


FIG. 7b

502  
518  
526  
8  
V

602 → 608a

604a

610a

612a

A	1	2	3	4	5	6	7	8

**FIG. 8a**

608b

604b

610b

612b

B	1	2	3	4	5	6	7	8

**FIG. 8b**

A				604a
1				
2	M	V		
3	i	e		
4				
5				
6				
7	Y	R		
8				

FIG. 8c

B				604b
1				
2				
3				
4	g	c		
5	h	t		
6	t	o		
7				
8				

FIG. 8d

**A**

1	z	Q	1	7
2	M	V	B	5
3	i	e	R	Q
4	8	Z	M	T
5	Q	Y	M	S
6	T	5	0	Y
7	Y	R	7	X
8	S	Q	B	R

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**B**

1	Q	1	L	5
2	4	T	N	X
3	Q	X	S	Z
4	g	C	Z	A
5	h	t	X	C
6	t	o	Y	C
7	C	m	Q	3
8	N	R	T	Y

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**FIG. 8e**

**FIG. 8f**

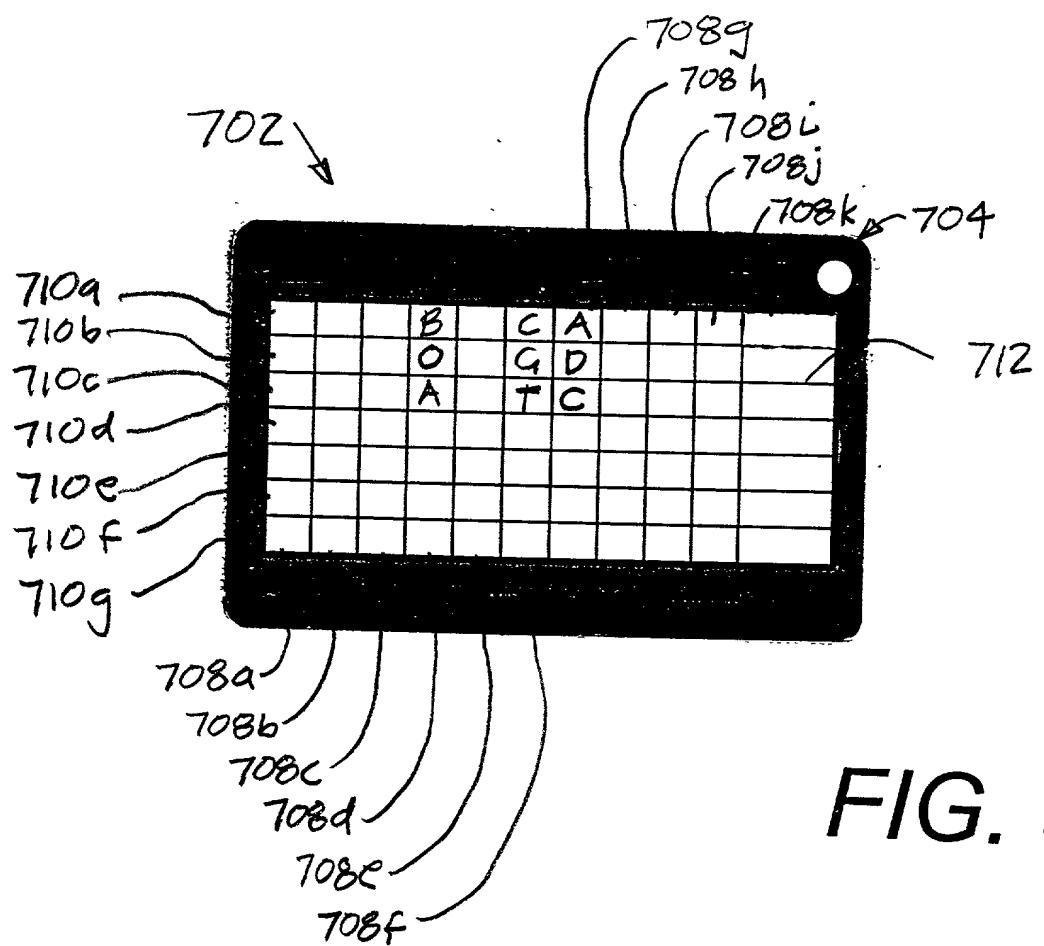
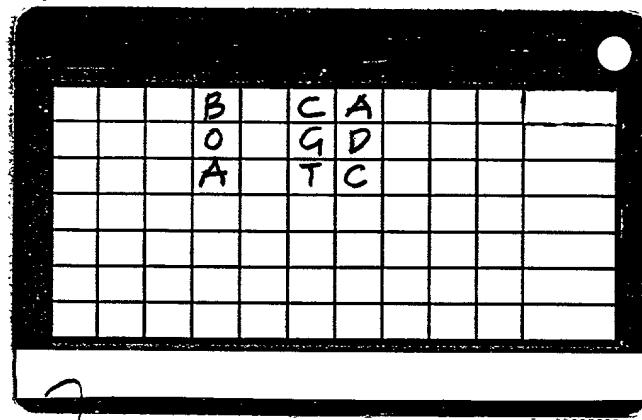


FIG. 9

802



804

FIG. 10

Express Mail No. EE232924206US

**DECLARATION AND POWER OF ATTORNEY  
FOR A PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **DATA STORAGE-ENCRYPTION-RETRIEVAL DEVICES AND METHODS WITH RESULTING BUSINESS PROCESSES**, the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Sec. 1.56. (Under Sec. 1.56 information is material to patentability when it is not cumulative to information already of record before the Patent and Trademark Office with respect to the present application and it establishes either by itself or in combination with other information a prima facie case of unpatentability of a claim or it refutes or is inconsistent with a position taken in opposing an argument of unpatentability relied upon by the Patent and Trademark Office or in asserting an argument of patentability. Under this section a prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable

construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.)

I hereby claim benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

Serial No. 60/139,279

Filing Date: 06/15/99

I hereby state that I do not know and do not believe that the invention was ever known or used in the United States of America before my invention thereof; that to the best of my knowledge and belief the invention has not been in public use or on sale in the United States of America more than one year prior to this application, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, or patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application; and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns.

I hereby appoint Malcolm A. Litman, Reg. No. 19,579; Gerald M. Kraai, Reg. No. 34,854; Mark E. Brown, Reg. No. 30,361; Kent R. Erickson, Reg. No. 36,793; Mark L. Kleypas, Reg. No. 43,720; and Marcia J. Rodgers, Reg. No. 33,765 all members of the bar of the State of Missouri, whose postal address is Shughart, Thomson & Kilroy, P.C., Twelve Wyandotte Plaza, 120 West 12th Street, Kansas City, Missouri 64105, telephone (816) 421-3355 as my attorneys, with full power of substitution, to prosecute this application, to make alterations and amendments

therein, to receive the patent, and to transact all business in the Patent Office connected therewith in my behalf.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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